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MORE THAN 700 GATHER TO CHART FUTURE OF CARBON SEQUESTRATION

PITTSBURGH, Pa.—As more than 725 key decision-makers from the business, government and academic communities gathered here for the Sixth Annual Conference on Carbon Capture and Sequestration from May 7-10, the overwhelming message was clear: industrial-scale storage can begin immediately with existing technology despite some of the regulatory and liability uncertainties associated with the technology. “Carbon capture and storage seems to be close to the takeoff stage and make no mistake now is the time to act—the time to act carefully and methodically to avoid unintended consequences,” act-

ing Assistant Secretary of Energy for Fossil Energy Thomas Shope said in remarks May 8. “We need to begin creating a statutory and regulatory system that is capable of dealing with the big financial, social, and legal questions such as licensing and permitting, recognize the accepted best practices, land owner royalties, citizens rights, long term liability and of course the possibility of leakage no matter how remote it is,” he said, adding that “without the facts and the evidence it is difficult to advance or oppose a rule on capture and storage itself.”

Local Officials Open Conference

Allegheny County Executive Dan Onorato (D) and Pittsburgh Mayor Luke Ravenstahl (D) opened the conference May 8. "Welcome to coal country," Onorato said, going on to highlight the work of the National Energy Technology Laboratory, which is in Allegheny County. "I took a tour of [the lab] a few months ago," he said. "It's right there with the technology that's being tested. It's carbon capture. If we could ever perfect that, we'd take away the biggest problem of burning coal and it will be the most reliable source of energy we would have here." Ravenstahl pointed out that the tremendous gains in air and water quality in the city over the last several decades gives a precedent for environmental health alongside growth, a key concern when implementing carbon capture and sequestration. "We are transforming ... from a smoky city, from an old city, to a new hip and energetic city," Ravenstahl said. "There's no reason certainly that we can't be the leader when we talk about coal and energy as well. I want to thank you all for the work that you do. I want you to know we are as committed as you are in the city of Pittsburgh to making this conference a success."

EOR Opportunities Abound

Several presenters at the conference emphasized that enhanced oil recovery, though representing a relatively small portion of sequestration opportunities in the United States compared to saline aquifers, will likely provide the first round of industrial-scale sequestration projects because of the added cost benefit and that much of the ownership, regulatory, and geological issues are already well understood. "The enhanced oil recovery piece of this is not the ultimate solution, that's a part of it, but it is technology that we've proven and it's something we know we can deliver," Shell Exploration & Production Americas VP for Corporate Support, Elizabeth Cheney, told *GHG*. "It may be a step because we've already got public acceptance around that."

American Electric Power CEO Michael Morris plans to make EOR sequestration part of his company's business model in the coming years. Earlier this year, AEP announced that it would retrofit two of its existing plants with carbon capture and that in one of them, located in Oklahoma, the CO₂ would be sold for enhanced oil recovery. "At the end of the day, I very much believe that someone will pay me for that CO₂ that might well pay for cost of the retrofit technology that I put on the plant," he said. The other AEP plant, located in West Virginia, will inject into saline aquifers, a type of geological structure where initial sequestration data is promising but much less is known at a large scale.

Iain Wright, Manager of the CO₂ Project at BP Alternative Energy, already has significant experience with large-scale injection of carbon dioxide given his company's work at the natural gas processing plant at In Salah, Algeria. The project captures CO₂ from the plant where it is injected into the gas field for enhanced gas recovery. Wright, as well, was bullish on oil and gas field CO₂ injection but tempered his optimism for saline aquifers. "For a saline formation, that information is missing, and so a lot more work is going to be required to appraise and characterize a saline formation than would be required to do the same for a mature oil and gas field," he told attendees.

Industry Cites Need for Regulatory Certainty

Regardless of existing regulatory structure in place for EOR, it still does not take into account questions of long-term liability for CO₂, let alone for less studied geological structures. "If governments don't create a positive investment climate, companies won't be financially able to deliver the world required solutions," Cheney said, noting that Shell supports a cap-and-trade system. Wright, whose company also supports emissions caps and carbon pricing, emphasized the need to have a clear view of what carbon prices could be 20 years into the future to have an accurate idea of what to invest in given that it will take three years

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to plan a project, three years to build it, followed by 40 to 50 years of usage. “We need to know A) that it is legal and B) we can get paid to do it, otherwise it’s not going to be a viable business,” he said.

Shope addressed concerns over investment, agreeing with Shell and BP’s main concerns over why carbon capture and sequestration is not moving faster. “I can tell you that it’s not a lack of will. It’s a technology issue and an investment issue,” he said. “Carbon capture and storage reflects an inconvenient fact of modern life. In the fundamental triumvirate of energy, the environment and the economy...it is difficult to make one major change without bringing on others.”

International Component Evident

The conference also hosted the Carbon Sequestration Leadership Forum during which members of six developing countries, including India and Brazil, exchanged information about how to build capacity for their own tests. The CSLF is made up of more than 21 nations and the meeting underscored the importance of sustainable growth and CO₂ emissions in developing nations. “It’s a global problem, its not just a U.S. problem,” said NETL Director Carl Bauer. Shope joined in the discussion by emphasizing the importance of growing emissions in developing nations. “Carbon dioxide can be stabilized only if the developing nations are persuaded to join the effort,” he said. “Capture and storage is the critical enabling technology because it will allow the world to meet its oncoming need for electric power with coal and at the same time make significant reductions in CO₂ emissions.”

David Hawkins, director of the Climate Center at the Natural Resources Defense Council, agreed that emissions from developing countries would be important but that the United States had to lead the world in the effort. “Action soon by the United States is critically important because if we do this we’re going to create a model for other rapidly growing parts of the world, especially countries like China and India,” he said, placing carbon capture and sequestration squarely at the center of that effort. “We’re going to demonstrate the reality of this work. We’re going to demonstrate that the United States takes this issue seriously enough to actually start building its power system of the future today.”

Public Acceptance Necessary

AEP’s Morris was particularly forceful about the need for public acceptance of the technology since relatively little is known in the public realm and that concerns over climate change will only continue to grow. “If we want cleaner air, its going to cost something,” he said. He

harkened back to his days in the natural gas business where they could know where natural gas was in underground storage to levels as low as within one hundred cubic feet even when prices were \$1/Mcf and that this same scrutiny could be applied to carbon dioxide, a non-flammable substance unlike natural gas. “For decades and almost centuries now we have been storing natural gas underground.”

Regional Partnerships Moving Ahead

Meanwhile, Shope reported that the seven DOE Regional Carbon Sequestration Partnerships are proceeding as scheduled with large-scale injection set to begin in 2008. “Today, the seven partnerships are in the validation phase of their activities,” said Shope, whose office oversees the partnerships. “Each is field testing a variety of reservoirs and they are measuring the potential for terrestrial uptake. They’re gathering the knowledge and codifying the best practices that will support the next steps. The next step is the deployment phase which we have expedited to begin in 2008. Plans are for each of the seven partnership to identify a site capable of storing at least one million tons of CO₂/yr and to meet all requirements necessary to begin. Four of those sites will get underway in 2008.”

FutureGen On Track

FutureGen also came up as a key effort from industry and government in the United States to prove capture and sequestration at scale. FutureGen Industrial Alliance CEO Mike Mudd said that the Alliance will soon sign a contract with an engineering, procurement, and construction firm for plant design. He also responded to criticism from the spring MIT report, *The Future of Coal*, which criticized FutureGen as being an industrial project masked as a research project. “FutureGen is clearly an R&D project,” he said, noting that one of its main purposes is to test different kinds of coal. “One point says there are ‘too many chefs in the kitchen.’ I guess I shouldn’t take that personally but I do know it’s a very challenging and complex project that is run with the industry discipline and leadership and that’s how we’ve been able to meet every milestone to date. So we are baffled by MIT when they say such a misstatement.” He continued, saying, “Without FutureGen, I don’t think we have the vehicle right now to be able to continue on a rapid basis to have the integrated demonstration of carbon capture and sequestration.”

Fuel Switching Feared

Mudd also identified a major fear from both a higher price and national security point of view: fuel switching to natural gas which is nearly all imported. “If we have an

immediate policy that mandates short-term reduction of CO₂ emissions, there is a quick solution. Its called low carbon fuels,” Mudd said, recognizing that many of the natural gas exporting nations are in unstable regions of the world and potentially hostile toward the United States. “Its called natural gas. Natural gas people recognize that.” Shope voiced Administration policy earlier in the conference, saying, “I believe a carbon tax would lead to a fuel switching scenario.” ■

UTILITIES, ENVIROS SHARE SUPPORT FOR CARBON SEQUESTRATION

PITTSBURGH, Pa.—The utility industry and environmental community are finding common ground when it comes to carbon capture and sequestration, a fact made clear at the Sixth Annual Conference on Carbon Capture and Sequestration earlier this month as utility giant American Electric Power and the Natural Resources Defense Council opened the forum with back-to-back speeches in support of large-scale deployment of the technology. “It really is time to get started,” said Michael Morris, CEO of American Electric Power in a May 8 presentation. “We really are in this challenge together and it’s a very real challenge.”

Morris was joined on stage by David Hawkins, director of the Climate Center at NRDC, who shared the same sentiments. “We have things to learn. We’re not going to learn those things with standard RD&D programs. We’re going to learn them by actually getting out and doing these things at scale,” he said. “Are we ready to do a multibillion ton program today? No, but we don’t need to be ready to do a multibillion ton program. We need to be ready to do five or six million tons a year at a time as new power plants are commissioned. We think we have the knowledge to do that and we think that if we get started and put the pieces in place we can do it in a way that will build confidence both in the industry and with the public.”

CCS Mandate Possible

In his remarks, Hawkins sought to debunk several of the arguments for not pursuing carbon capture and sequestration in the short term, including that the cost will be prohibitively high, capture technology is not ready, technology winners will be chosen outside of the market, geological sequestration is poorly understood, and carbon dioxide leakage will pose a threat. “We can no longer assume or pretend that business as usual RD&D is going to deliver the products we need on time,” he said. “We believe that this congress in this session should declare as a matter of national policy that no new coal plants will be built in the United states unless their CO₂ is captured. Period.”

Morris responded to that assertion by saying that it would be possible for the electric utility sector to reach such a goal. “David would suggest and it might well be the case and if it is, it is, that no new plant with coal as its fuel source be permitted in the United States without carbon capture and storage associated with it,” he said. “That might well be the case and if it is, I assure you that this industry and its suppliers of technological equipment will find a way to accomplish that goal.”

AEP: Utilities Can Take CO₂ Liability

Notably, responding to a question about how liability for carbon dioxide would be treated, Morris said that there is not enough time to “worry or wait” for government indemnification of CO₂. “At the end of the day, companies like ours, whatever we do, we’re ultimately responsible for it,” he said. “To believe that government will stand 100 percent as the indemnifier of what we might or might have done correctly I think is very wrongheaded thinking.”

IGCC Likely the First Round of New Plants

Hawkins and Morris also shared the view that integrated gasification combined cycle (IGCC) power plants will likely make up the first round of new coal plants ready for carbon capture and sequestration. “I am more convinced in the pre-combustion cycle of new coal plants that the answers are much closer at hand,” Morris said. IGCC provides separation of carbon dioxide prior to combustion of the fuel. He also noted that he has been pleased by the work GE and Bechtel have done on the technology and that AEP and other utilities like Duke Energy have made in commitments to building IGCC plants.

Hawkins pushed the point further, saying that this first round of IGCC plants should not exclude other technologies from entering the market. “It may well be that the first applications of power plants, of coal plants with CO₂ capture, may decide to use IGCC technology. That’s fine, that doesn’t rule out other technologies,” he said. “There are other technologies that are of interest to the industry. Those technologies will do just fine under an accelerated deployment strategy, indeed they will do better because the market will be there to pressure their development and to reward entrepreneurs who find ways to make them work.”

Retrofitting the Major Challenge

In addition to IGCC pre-combustion technology, the two other major capture methods are oxy-fuel combustion and post-combustion capture. Oxy-fuel combustion, a relatively new technology and already on the market from Babcox & Wilcox, allows fuel to be burned by pure oxygen which creates a relatively pure, dense stream of

CO₂. Post-combustion capture takes the flue gas, which is usually about 15 percent CO₂, and separates it from the rest of the gas.

Since the entire fleet of existing plants are conventional pulverized coal-fired power plants, Morris put forward several arguments for retrofitting these plants for post-combustion capture. "Proven technology is near at hand," he said. "The serious challenge is the post-combustion retrofit technology that is essential if we are going to be able to keep this economy moving forward." Morris also cited talk in the late 1980s and early 1990s that limiting emissions of SO₂ and NO_x from flue gas in post-combustion would be far too expensive. "We as an industry talked years ago about acid rain and the billions and billions and billions of dollars that it would cost. It didn't. So why today spend an inordinate amount of time talking about billion and billions of dollars because it might be?" he asked attendees.

Price Bump Likely

Morris gave the example that for his company they average a cost of production slightly under 6 cents per KWh and if that is increased by 40 percent, likely the rate of increase for post-combustion CO₂ capture, it would rise to 8.4 cents per KWh. He pointed out that in Texas, the average price for generation is 17.5 cents per KWh. "I think that's a heck of deal for my customers," he said. "Now, I can tell you my large industrial customers won't think much of the deal but at the end of the day, they'll decide that that probably is worth it because this is a societal issue and it's an issue that we will all come to grips with over some period of time."

Hawkins also addressed this issue, dismissing arguments that post-combustion capture will cost far too much for it to be deployed throughout the existing fleet even though it will add that 40 percent to current production cost. "We can spread those costs over the electric system. This is a public good that we're looking at in terms of managing CO₂," he said. "We've got a technology that there's a public value in deploying. If we spread the costs over the power sector generally, we could equip all of the forecasted coal plants between now and 2020 for about two or three percent rate increase. We think that's a doable proposition, one that ratepayers will understand and one that politicians could expect. So we don't have to be deterred by the fact that on an individual plant basis, the costs look sizeable."

Regulatory Certainty Vital

As utilities move toward the deployment of new power plants, Morris made it clear that regulatory certainty is

necessary to ensure a return on investment. "I am a believer in regulatory certainty before I plunk down a couple of billion dollars of my investors' money," he said, noting that he ultimately wants to get new coal plants to cost just 20 to 30 percent above what a pulverized coal plant would cost. "I want to make certain that our customers understand where the end game might be when those plants might come online." Morris, as he also testified in front of Congress, said that state regulators should make the final decisions on building plants no matter what national legislation is passed. He argued that state regulators and utilities are in agreement in that they need to provide electricity for the public good and that utilities will have to know from regulators that they have a return of an on the equity capital and debt capital to get these facilities running. "I would argue that the regulator is much more prepared to do that than many people believe," Morris said. "This a very important mutual obligation that is well understood and one that I think we can get to."

Hawkins pointed out the important role that the national government will have to play. "EPA has a role here," he said. "EPA needs to write the rules of the road for permitting and operating these facilities. We think EPA has the capacity to do that in consultation with other agencies with expertise. I think they need to be told to do it because they're not doing it on their own but that's a job that Congress could and should do."

Out With the Old, In With the New

Prevalent in the discussions of both speakers was that the old ways of conducting business and dealing with climate change were over. Hawkins cited the private takeover deal of TXU and the subsequent decision to build three pulverized coal plants alongside near-zero generating facilities like IGCC with carbon capture and sequestration. "To me, the TXU announcement reflects an awareness that the old style of doing business in the power sector is not going to be a viable path and that we're going to have to focus much more aggressively on carbon management," Hawkins said.

He also pointed out the political dimension of the debate where representatives who represent major emitting industries are now the ones most active in seeking climate change solutions. "Politicians are at least waking up to the fact that they have to have a story to tell on global warming," said Hawkins. He noted the importance of having the automobile and coal industries represented in Washington as important in the form of House Committee on Energy and Commerce Chairman John Dingell (D-Mich.) and Subcommittee on Energy and Air Quality Chairman Rick Boucher (D-Va.). "They certainly have the kind of ability to make the kind of change if they decide to do it." ■

REID TO BRING ENERGY BILLS TO THE SENATE FLOOR

Legislation Will Combine Several Measures Including Carbon Sequestration Bill

Senate Majority Leader Harry Reid (D-Nev.) introduced legislation (S. 1419) on May 17 comprised of four bills that have cleared committee which he intends to bring to the floor in the coming weeks, including a bill approved by the Energy and Natural Resources Committee that would authorize \$1.4 billion for at least eight industrial-scale carbon sequestration projects and create a nationwide survey of geological structures suitable for sequestration. The broad legislation does not include cap-and-trade provisions or any direct mandates for economy-wide greenhouse gas emissions reductions. "Democrats are moving forward with energy legislation to increase the nation's use of renewable fuels; improve the energy efficiency of vehicles, buildings and products; and advance research on capturing and storing greenhouse gas emissions," Reid said in a May 17 statement.

The carbon sequestration, energy efficiency and biofuels package came out of the Energy and Natural Resources Committee (*GHG*, Vol. 2 No. 10). Additionally, the fuel economy standards legislation came from the Commerce, Science, and Transportation Committee and the green buildings legislation came from the Committee on Environment and Public Works. Legislation from the Foreign Relations Committee that calls for the United States to engage with other nations to form strategic energy partnerships is also part of Reid's bill. "While this Administration has made it a priority to give tax breaks to oil and gas companies even as prices have doubled and oil company profits have soared, this composite bill is a solid first step toward our goals of greater energy independence and reducing the risks of global warming," Reid said. ■

HOUSE SCIENCE PANEL WORKING ON SEQUESTRATION LEGISLATION

The House Committee on Science and Technology is writing a carbon sequestration bill, though details are still being worked out, Rep. Nick Lampson (D-Texas), chairman of the panel's Subcommittee on Energy and the Environment, said following a May 15 hearing on the technology. "We will have a bill," he told reporters. "We're going to try to come up with something that we can bring out of this committee, a piece of legislation. I don't know what it is going to include right now but staff is working on it. Hopefully we'll have something that's going to be worthwhile. We definitely want to do something and its almost, we feel very far behind what Europe

is doing and I'm hoping that we can do something that will help us catch up."

Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-N.M.) introduced legislation authorizing \$1.4 billion for at least eight industrial-scale carbon sequestration projects after his panel held a carbon sequestration hearing last month. That bill is set to become part of a compilation energy bill Senate Majority Leader Harry Reid (D-Nev.) expects to bring to the floor in the coming weeks (*see related story*).

Integration Of Components

At the May 15 House hearing, Gardiner Hill, director of CCS Technology at BP Alternative Energy, detailed his company's work on industrial-scale sequestration projects at Peterhead in Scotland and Carson, Calif. "One of the key things we are learning as we do this detailed work is the integration of various components of the overall process in a way that will have a high degree of efficiency and operability," he said. "I think there's only so much we can do when looking at individual components, really what we need now will be very large-scale integrated commercial scale projects to prove integration of the various components, the operability, and the overall costs and we've only discovered that when we actually build them."

Michael Rencheck, senior VP for Engineering Projects and Field Services at American Electric Power, pointed to two capture and sequestration projects the company is working on at existing plants, emphasizing that for planning for future capture at scale with new technologies will be a major challenge. "As we talk about that, we also need to also advance the combustion process and the pre-combustion process through all supercritical technology or IGCC technology in addition to post-capture and capture and storage as well," he said.

Capture To Be Most Difficult

The capture side of the process of carbon capture and sequestration will likely prove to be the most costly and technologically difficult, witnesses told the Committee. "I would point out that capture is one of the big costs. It's almost as if you can look at two big issues," said Stu Dalton, director of Generation at the Electric Power Research Institute. "You really do want to test it together."

The cost of electricity is expected to rise under any of these scenarios with capture to make up the largest portion of those costs. "What's important to realize is that electricity is a low-value product and that it dispatches to whoever's got the lowest price built," said National Energy Technology Laboratory Director Carl Bauer. "For some-

one like an AEP to make an investment on a plant that they couldn't dispatch early and recover cost, it's a prohibitive hurdle to get over on their part and that's the real issue we're trying to move forward on this."

Sequestration Very Possible, Panel Told

Witnesses also expressed optimism that the current data shows that large-scale sequestration is possible with low risk of emissions leakage. "The risks are just beginning to be quantified," said Dr. Robert Finley, director of the Energy and Earth Resources Center for the Illinois State Geological Survey and leader of the Midwest Geological Sequestration Consortium. "My feeling as a geologist is that the risk, there's the natural risk posed by the geology itself and then there's the risk posed by the facilities," he said. "I think the risk, if we carefully cite these projects and we assess the geology extremely carefully with geophysics and seismic, look to make sure there are no faults or fracture zones, I think that risk is relatively low. I think that the larger risk as we get many of these projects is to make sure that the demand infrastructure—the wells, pipelines, compressors and so forth—are done with the utmost care." ■

CONGRESS LOOKS TO INDUSTRY FOR GUIDANCE ON GHG REDUCTION

Industry leaders told lawmakers at a May 9 Senate hearing that Congress should pass carbon cap-and-trade legislation as quickly as possible to compel progress on greenhouse gas technologies, adding that federal investment and incentives will be an integral part of any scheme to develop those technologies. Even as Senate Environment and Public Works Committee Chairwoman Barbara Boxer (D-Calif.) and Ranking Member James Inhofe (R-Okla.) continued to trade barbs over the costs of addressing climate change, executives from General Electric, Wal-Mart, Babcox & Wilcox, and American Electric Power testified before the panel's Subcommittee on Private Sector and Consumer Solutions to Global Warming and Wildlife Protection, saying they are planning for an eventual price on carbon emissions, and stressing that enumeration of Congress's direction on the carbon issue is of highest importance in driving the market.

Congress: What Do You Need?

Sen. John Warner (R-Va.) asked the panelists to guide the subcommittee as it looks at various pieces of carbon emissions legislation. "It seems to me it would be helpful if we could get some common starting place," Warner said. "Do you want that program not only to have a regulatory portion, but also federal grant subsidies, or tax relief for

the heavy investments your companies have made?" The executives told the subcommittee the industry needs to know where Congress is going with respect to carbon pricing. "More than anything, we need clarity of purpose, where the country, the world and our company is going," said General Electric Energy's Global Research Vice President Mark Little. "Clarity of purpose and a definition of goals is absolutely critical."

American Electric Power Senior Vice President Michael Rencheck said even short-term decisions are affected by the lack of policy set forth on the issue. "Regulatory certainly is absolutely a quirk in our business," Rencheck said. "Without that understanding of what the regulatory framework will entail, it certainly creates great distress in making incremental decision about asset additions." Babcock and Wilcox Companies CEO John Fees, whose company, BWX Technologies, has invested \$49 million in the development of clean coal technologies, said the hazy future of the carbon market is preventing industry from pursuing a full-blown development and deployment effort. "Industry and our clients need some level of certainty, and I think this problem is creating a level of uncertainty," he said. "I think the sooner we get to that point, the more we can sustain our investments and know where we're going as a company."

Financing A Must

Each of the executives admitted that the main greenhouse gas technologies are not ready for commercial deployment yet, and stressed the importance of federal financial commitment that will help develop those products. "I think a very strong R&D tax credit program for the work that's going on towards carbon capture technologies would be very beneficial to the industry," Fees said. BWXT is doing research on several carbon capture technologies, and has recently been contracted by AEP to do a feasibility study on retrofitting on of the utility's coal plants with "oxy-coal combustion" technology to capture carbon. "We're spending a lot of money without a broader incentive, but it would be very, very helpful to encourage industry," Fees added.

Little also touted the possibility of a tax credit, citing GE's success with the government's wind power tax credit. "We have a production tax credit supporting wind power today, and stability in that regime has had a huge impact," Little said. "It has been an on-again, off-again sort of program. We've had stability in the past two years, and that has ignited a tremendous run for wind power in the United States." Rencheck also said that a bill should include a provision giving companies credit for the voluntary actions they've already taken. "We're going to need long term public and private funding for the development of technol-

ogy,” he added. “It’s not going to happen overnight, but with increased funding and resources, it can move faster.”

Subcommittee Chair Joseph Lieberman (I-Conn.) interpreted the speakers’ comments. “So I think what we’re hearing, is even where the technologies are not exactly where we need them to eventually be, that should not be an excuse for not setting out in law a series of goals alongside support for increasingly advanced technology,” he said. “In addition to giving you, as soon as possible, a legal and regulatory certainty, we have a responsibility to continue to invest tax credits in these technologies that we don’t fully have yet.”

Lawmakers Debate Cost

Inhofe, a staunch skeptic of global warming, warned at the hearing that any measures endorsed by the committee should be mindful of causing harm to the U.S. economy. “What technology paths and goals we choose will help determine if further innovation acts as a catalyst or a drag to future economic growth,” Inhofe said. He also called attention to the potential costs of implementing the various pieces of climate change legislation on the table. “My point is this. Our policies should reflect a little humility when it comes to whether or not we are omnipotent,” Inhofe said. “That is why I oppose propping up uncompetitive technologies for the sole purpose of trying to avert an over-hyped catastrophe by mandating a tax on carbon.” Inhofe also submitted to the record a recent MIT study that he says “shows that the Sanders-Boxer bill [S.309 on Global Warming-Pollution Reduction] would impose a tax-equivalent of \$366 billion annually, or more than \$4,500 per family of four, by 2015.”

In a counterpoint, Boxer entered into the record the recent report of Sir Nicholas Stern, *The Economics of Climate Change*. “Sir Nicholas Stern, the lead economist at the World Bank, said that spending a dollar now saves \$5 later, and so I think the cost issue is really debatable,” she said. “In my former life I was a stockbroker, and I know the difference between an investment that pays dividends and an expenditure. What we invest here makes sense.” Carper seconded Boxer’s remarks. “In my heart I believe it’s possible to enforce these new technologies, to reduce CO₂ emissions, and to do it in a way that fosters economic growth, that leads to technologies and leads to new products that we can sell around the world.”

Comparisons to Manhattan Project, Space Program

With regard to what is needed for a federal program for greenhouse gas technologies, Boxer and Sen. George Voinovich (R-Ohio) both referenced large, expensive government projects that represent major governmental

funding commitments—she the U.S. Manhattan Project to develop the atomic bomb, and he, the Russian space program. “We do need a Sputnik-like commitment to funding energy technology, particularly technology for carbon capture and sequestration,” Voinovich said, continuing by summing up the biggest challenge that Congress may face in the coming months. “We also have to understand that if we ever are going to get anywhere on this committee, or in Congress, we have to harmonize our views on energy, our environment and our economy. For some reason, we’ve never been able to get the will to do that. I’ve been here for eight years, and it just doesn’t happen.”■

HOUSE FOREIGN RELATIONS CHAIR TO INTRODUCE CLIMATE CHANGE BILL

Legislation Would Require U.S. to Engage in Negotiations for Post-Kyoto Framework

House Foreign Affairs Committee Chairman Tom Lantos (D-Calif.) has joined the climate change debate, stating his intention last week to introduce a bill that would require the United States to engage in negotiations for a post-Kyoto carbon emissions reductions framework. “Under my legislation, Cabinet-level officials will board planes to represent the United States at critical climate change negotiations,” he said at a May 15 hearing before his committee. “Instead of turning their backs on the United Nations, our diplomats will negotiate intensively within the global framework. And if the White House heeds the call of my bill, our diplomats will have a bold new mission—to negotiate a post-Kyoto framework that contains binding commitments for environmental action from all of the world’s polluters, including China and India.” In addition, Lantos said that the bill will also:

- Require money to be allocated to the U.S. Agency for International Development to help developing nations create the regulatory and financial environments to implement more efficient and cleaner technologies;
- Establish incentives to increase American exports of these technologies; and
- Establish an international semi-autonomous Clean Energy Foundation which would “leverage the resources that NGOs, private companies, and foreign governments can bring to bear.”

At the hearing, Eileen Claussen, President of the Pew Center on Global Climate Change and a former Assistant Secretary of State for Oceans and International and Scientific Affairs under President Bill Clinton, said she generally supported the proposal.

Int'l Agreements Could Provide Loopholes

Committee Ranking Member Ileana Ros-Lehtinen (R-Fla.) expressed skepticism over the United States joining an international agreement which might provide opportunities for developing nations to take advantage of American commitments to carbon caps. "As we have seen across a number of sectors including most recently on issues relating to proliferation and human rights, seeking consensus through such international agreements can often translate into race to the bottom or the lowest common denominator outcomes," she said. "Such agreements will also raise concerns about possibly surrendering U.S. sovereignty to international mechanisms that can easily be manipulated to serve as anti-US or anti-developed world."

W. David Montgomery, vice president of CRA International, backed total "global engagement" and echoed similar sentiments. "Mandatory U.S. greenhouse gas controls and any version of the Kyoto Protocol would impose a significant cost on the U.S. economy," he said, adding that the Clean Development Mechanism is a market that is easy to manipulate. He argued that a similar scheme post-Kyoto would create a "shift of investment away from the U.S. and toward countries like China and India that are not willing to undertake similar efforts." He encouraged the United States to engage with the top emitting nations in the world since this would provide a core group for negotiations and smaller emitters would get on board.

U.S. Reductions Yield International Credibility

World Resources Institute VP for Science and Research David John Jhirard said that the only way the international community, including developing nations, could take the United States seriously on this issue was if the United States were to take concrete, credible action to reduce its own emissions. "Effective and credible leadership by the United States in the international arena demands that we implement strong federal legislation that captures the twin benefits of reduced petroleum consumption and greenhouse gas emissions," he said. ■

COAL-TO-LIQUIDS BILL WOULD MANDATE CARBON SEQUESTRATION

The federal government would back six coal-to-liquids plants with profit-sharing loan guarantees under legislation introduced in the House this month, provided that the plants are equipped with carbon capture and sequestration and that the resulting fuel has the same or less lifetime CO₂ emissions from petroleum refining. The bill was introduced May 8 by Rep. Rick Boucher (D-Va.), chairman of the House Energy and Commerce Subcommittee on

Energy and Air Quality, and Subcommittee member John Shimkus (R-Ill.). "The novelty of coal liquefaction technologies to the United States means that obtaining the investment capital for facilities is still somewhat uncertain," Boucher said in a statement. "Our legislation will resolve much of the uncertainty and speed the arrival of coal to liquids plants in the U.S." In addition, the bill provides that:

- If the price of crude oil falls below about \$40 per barrel, the government would make a payment to a facility owner, establishing a price floor for the liquid fuel;
- If the price of oil rises above a certain level, to be determined by the Secretary of Energy, the plant would make payments to the federal government; and
- One or two of the plants will be owned by "small coal producers."

The legislation has been referred to Boucher's subcommittee, where all nine cosponsors of the legislation are members. Boucher, who represents a coal-producing district, has long been a supporter of coal-to-liquids technology, but given his concern over climate change the bill represents a compromise between Democrats and Republicans regarding climate change and energy security. One of the largest criticisms of coal-to-liquids is that the plant and the fuel emit twice as much CO₂ lifetime compared to the refining of petroleum and its combustion. However, one of the greatest assets, supporters argue, is that making domestic fuels from coal will offset dependence on foreign oil. "Coal to liquid technology will allow the United States to use our own energy resources—in this case coal—so that we increase domestic production of fuels," Shimkus said. "This will reduce our demand for foreign oil and give our military and transportation sectors a valuable alternative to petroleum."

Others Propose Carbon Standard For Fuels

In an interview with *GHG* last week, Dr. Robert Williams of Princeton University pointed out that capture on coal-to-liquid plants with current technology costs approximately \$8/MT CO₂ while on conventional pulverized coal-fired power plants it is about \$40/MT CO₂. Williams was supportive of the carbon capture and sequestration portion of the bill but did not support the idea of a price floor. "What I would do instead is put a tax on transport fuels that when the oil price falls below \$40 per barrel, that would keep the price to consumers the same and then rebate the revenues of the tax to both the synfuel producers and not just coal synfuels," he said. He argued for a policy which takes advantage of the market, doesn't pick technology winners and deals with climate change and energy security. "A policy that is a very good example of that is

the low carbon standard for fuels that California Governor [Arnold] Schwarzenegger (R) announced in early January. That does not specify what the winners are and if you couple that with something like the 'fee-bate' on synthetic fuels, that would not pick winners or punish losers. The market would do that."■

NY MERCANTILE EXCHANGE INTERESTED IN EMISSIONS TRADING

NYMEX Holdings, Inc., home to the New York Mercantile Exchange, this month indicated its interest in forming its own greenhouse gas emissions contracts, although it remains undetermined whether they will be for a voluntary or a compliance market. "There's no determination yet if it's going to be a national or international contract, if it's going to be based on voluntary or mandatory credits," Anu Ahluwalia, NYMEX spokeswoman, told *GHG*. The new market is expected to be in competition with the Chicago Climate Exchange, the only voluntary greenhouse gas exchange in the United States. "It's all being considered at this point. We're looking at talking to other experts in the industry to see if we partner with somebody, if we go out on this alone, who will back the contract if it makes sense. It's very early for us. This isn't something we're going to turn around in six weeks or three months or anything like that. It's a big project but we'd like to be the ones who do it correctly to offer the right product to be adopted."

Changing Marketplace

The changing marketplace with greater awareness in industry of its emissions levels and the increased likelihood of greenhouse gas caps brought industry and NYMEX together to make the move. "We've been approached by the industry, the customers who are interested in trading carbon emissions futures," she said.

"Industry is the common component in our development of a lot of contracts. They say to us, 'hey what do you think about this? We really need this.' That's how a lot of contracts get launched at NYMEX but we also have a research team that's out in the field looking at things that are cutting edge, trying to develop new contracts so I think it's a combination of the two."

CCS, Specifics Unclear

One of the most difficult tasks will be to establish a standard to determine that emissions reductions are additional to any business as usual actions which will ultimately determine the credibility of the market. "We're in the research phase of this, trying to figure out how to develop a contract that people can trade. The question is how to make it the most efficient contract and something

that will be widely accepted," she said, adding that any standards on carbon capture and sequestration are far down the line. "I think it's a little early in the process for us to address that. We're literally trying to work with industry to figure out what they need and how to develop a contract that they will be able to use."■

PRESIDENT ISSUES ORDER TO REDUCE GAS CONSUMPTION BY 20 PERCENT

Move Central to Administration's Response to Supreme Court Decision

President Bush on May 14 signed an executive order that directs government agencies to coordinate with one another to begin implementation of the President's goal of reducing gasoline consumption by 20 percent from anticipated levels in 10 years. "Last month, the Supreme Court ruled that the EPA must take action under the Clean Air Act regarding greenhouse gas emissions from motor vehicles," Bush said in a Rose Garden press conference, stating that his "20-in-10" plan will be the response to the Supreme Court's decision in *Massachusetts v. EPA* (see related story). "So today, I'm directing the EPA and the Department of Transportation, Energy, and Agriculture to take the first steps toward regulations that would cut gasoline consumption and greenhouse gas emissions from motor vehicles, using my 20-in-10 plan as a starting point." He also added that his goal is to have these regulations in place by the time he leaves office in January 2009 but that legislation would be the best way of dealing with gasoline consumption. "This is a complicated legal and technical matter, and it's going to take time to fully resolve," he said. "Yet it is important to move forward, so I have directed members of my administration to complete the process by the end of 2008."

Democrats Critical of Order

The executive order leaves open the possibility of regulation for non-mobile emissions but Bush's comments about the difficulty of coming up with a solution sent a clear message to Democrats on Capitol Hill. "It appears that the President wants to run out the clock to the end of his term without addressing our energy needs, because the executive order will do nothing to promote energy independence," said House Speaker Nancy Pelosi (D-Calif.). "Instead, it is clearly designed to bog down the Environmental Protection Agency in a bureaucratic interagency process that will ensure that no steps are taken to regulate greenhouse gases from motor vehicles."

Senate Democrats were equally skeptical of the meaning of the order, shunning it as a mere statement of interagency cooperation. "While good relations among agencies are

important to the regulatory process, it's also important to recognize that reducing gasoline consumption requires more than good interagency dynamics," said Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-N.M.). "The absence of any standards in today's announcement is a reason why Americans will be looking to Congress for stronger leadership on energy policy."

For his part, Senate Energy and Natural Resources Committee Ranking Member Pete Domenici (R-N.M.) was encouraged by the order. "The President clearly believes that the Administration has the authority to implement new regulations on these matters," he said. "In my view, having the White House actively engaged in reducing gasoline usage is a positive sign. I believe Congress should continue its efforts on these matters, and work together with the Administration to meet the demands of the American people." ■

EPA CONSIDERING PATH FORWARD IN WAKE OF MASS. V. EPA DECISION

The U.S. Environmental Protection Agency plans to move forward on the potential regulation of CO₂ as an air pollutant, following a landmark U.S. Supreme Court decision last month. Any action, though, will have to wait until the case is returned from a federal appellate court, where parties are set to submit motions for further proceedings by June 7, EPA officials said May 14 at a roundtable hosted by the Environmental Law Institute in Washington, D.C. "When this comes back before the agency, we have to do something. I think that [what's] clear from the Supreme Court case is that the Supreme Court said all the arguments should be raised," said Robert Meyers, associate assistant administrator for the EPA Office of Air and Radiation. In *Massachusetts v. EPA*, the Supreme Court ruled that CO₂ is an air pollutant and that the EPA must go back to section 202 in the Clean Air Act, which deals with automobile emissions, and regulate it based on science and not policy considerations. "The procedure within 202 is not set out in statute. Once it gets back, once we decide how to address it, then we'll be looking to our normal statutory and administrative process," Meyers said

Massachusetts Promises To Keep Pressing

Massachusetts Assistant Attorney General James Milkey, who argued the case before the Supreme Court, was unable to attend the event but issued a statement saying the state planned to continue pressuring the EPA and Congress on the issue. "We are hopeful that the case will help spur additional action by Congress although we no longer need to wait for new legislation in order to achieve meaningful

reductions in greenhouse gas emissions," Milkey said. "We have no intention of resting on our laurels but will instead redouble our efforts working with other states and environmental groups to press forward on all fronts."

Economic Costs Could Be High

Since the Court's decision is still relatively new, it has not yet been factored into economic decisions by major corporations, especially energy-intensive industries, such as manufacturing, utilities, and the oil and gas sector, roundtable panelists said. "Companies are sort of beginning to see that carbon regulation is something that is very likely to happen and so they might need to start planning for it," said Paul Turner, partner at Sutherland, Asbill, and Brennan in Houston, Texas. "Certainly in the transactions for generating units and sort of companies with generation, as of yet I haven't seen that come in just because of ... how recent the case is but you certainly would expect to see that come in also as people are sort of contracting for long-term power [and] engaging with transactions," Turner said. "You would expect them to sort of have to build that into their forward price curves."

The possibility that long-term power contracts may include clauses for regulatory change has been discussed, according to industry representatives, who added that set regulations will be needed to establish certainty moving forward. "I've actually had several conversations with folks about whether it makes sense to sort of add in regulatory change clauses into the transactions because there's so much unpredictability in what regulation may look like that it's hard to build that into their price curves and so it creates a lot of uncertainty in the marketplace for power," Turner said. He added that the price of fuel and power will likely rise under carbon regulations. "It's likely to have frankly some significant effects on future prices for power as the sort of basically the supply mix of generation gets shifted around as those that require purchase of emissions credits become relatively more expensive so that natural gas plants would tend to run more," Turner said. "That, likewise, likely could have the effect of sort of continuing the volatility in the natural gas markets and you'll likely see a lot of the trading companies get much more involved in the markets in carbon, sort of providing hedging services. They'll sort of try and bring liquidity to that market so that they can provide that service."

Administration Backed Into Corner

The roundtable came as President George W. Bush issued an executive order May for federal agencies to cooperate on implementing a goal of reducing gasoline consumption by 20 percent from expected levels within 10 years (*see related story*). While the White House said it will also

need legislation to meet the goal, lawmakers on Capitol Hill have already begun pushing for increased corporate average fuel economy (CAFE) standards. A bill implementing increased CAFE standards has recently been approved by the Senate Commerce, Science and Transportation Committee, with the measure having been bundled in with other legislation by Senate Majority Leader Harry Reid (D-Nev.) for consideration on the Senate floor (*see related story*). “The Administration has been somewhat backed into a corner by Congress pursuing CAFE legislation that the Administration has not yet endorsed,” David Doniger, senior attorney for the Climate Center at the Natural Resources Defense Council and a lead petitioner in *Massachusetts v. EPA*, said at the May 14 event. “Then there’s being backed into a corner by the Supreme Court decision in that up until now the Administration’s position was that CO₂ is not a pollutant, not a subject to be dealt with under the Clean Air Act,” he said, adding, “So, I think we would not be having this announcement but for Massachusetts, but for the pressure coming from the Hill on CAFE and more generally on greenhouse gas legislation.”

Historical Precedent

According to some event participants, the Supreme Court ruling is likely to accelerate Congressional action on carbon dioxide and that the next two years are set to follow a similar historical pattern as was seen in the 1970s with amendments to the Clean Air Act. “It may tend to think that that’s going to take some time and it may take beyond the current Congress although I tend to think this year and next year are sort of at least the testing ground, if you will and I think about, for example, what happened with the Clean Air Act Amendments of 1977,” said Norm Fichtorn, a partner at Hunton & Williams in Washington, D.C. “What we had was in 1975 and 1976, extensive activity in the House and the Senate to develop comprehensive legislation that didn’t quite make it through by the end of the Congress in 1976. But then in 1977 with the new President taking office, President [Jimmy] Carter at that time, and all the work having been done to think through the issues, Congress did pass comprehensive legislation in 1977. We may see a similar pattern now.” ■

MULTI-STATE GREENHOUSE GAS REGISTRY LAUNCHED

The highly anticipated multi-state greenhouse gas registry was formed earlier this month, as 30 states joined to form The Climate Registry, which will assist in measuring, tracking and verifying emissions of greenhouse gases as well as provide measurement and reporting infrastructure for reduction programs. “Participating in The Climate Registry is a critical step forward in Colorado’s efforts to

address climate change,” Colorado Governor Bill Ritter (D) said. A central goal of the registry is to provide uniform reporting and measurement protocols in member states which span the country. “We can only manage what we can effectively measure. Getting accurate data on GHG emissions is a vital first step towards addressing the impacts of climate change in Colorado. It also makes sense for states to share resources and synchronize our programs.”

The Climate Registry is partially based on the California Climate Action Registry and it will accept reporting data in 2008. Participating states include: Arizona, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Utah, Vermont, Washington, Wisconsin, Wyoming. The Canadian provinces of British Columbia and Manitoba as well as the Campo Kumeyaay Nation are in the registry as well. ■

DOE ISSUES DRAFT REGULATION ON ENERGY LOAN GUARANTEES

The Dept. of Energy plans to review applications for the initial round of loan guarantees for innovative energy projects while simultaneously finalizing a rule to govern the program, according to its proposed rulemaking for the loan guarantee program that was issued May 10. DOE will extend invitations to apply for a loan guarantee to companies that submitted pre-applications in 2006, and those applications will be evaluated based on the earlier loan guarantee guidelines issued in August 2006, according to DOE General Counsel David Hill. The first round of loan guarantees will not be awarded to nuclear power projects, as the original guidelines did not include nuclear power under the heading of “innovative technologies” specified by the Energy Policy Act of 2005.

Congress stipulated in the FY07 Continuing Resolution that DOE cannot award any loan guarantees until a regulation is in place. However, nothing precludes the Department from reviewing pre-applications and soliciting applications before that rule is finished. DOE received 143 pre-applications for loan guarantees in 2006, half of them for biomass, although advanced fossil energy projects like carbon capture and sequestration—which represented only 16 percent of applications—requested a disproportionate 69 percent of total loan guarantees. DOE spokesperson Megan Barnett could not say last week how many pre-applicants DOE would be inviting to submit applications. “We’re trying to dual track things a little bit,” Hill told reporters May 10. “We’re anticipating inviting some of

those pre applicants to submit applications, and we're trying to move that and the rule in parallel."

Loan Guarantee Provisions

In response to Congress's insistence that the intent of the Energy Policy Act was to provide loan guarantees for up to 80 percent of the total cost of a project, the proposed rule specifies that loan guarantees awarded under the program can guarantee no more than 90 percent of a single loan instrument, as long as that amount does not exceed 80 percent of the total project. The preliminary guidelines issued in August 2006 specified that the guarantees would only cover 80 percent of a loan instrument, which would not have allowed for 80 percent of the total project cost to be guaranteed, given the requirement for applicants to have "significant financial commitment" to the project. "That 90 percent is actually more than OMB circulars say is generally appropriate for federal credit programs," Hill said after the release of the proposed rule. "The reason we are going above is because of this program's focus on innovative technologies that aren't in full commercial use yet."

'New and Significant'

Hill said in the press conference last week that there were no plans at this time to further define "significant financial commitment," stating only that it requires applicants to "make a significant equity contribution to be eligible for a loan guarantee." The rule does, by contrast, spend several paragraphs defining what EPAct 2005 meant in its outline of the loan guarantee program by "new or significantly improved" technology. The proposed rule defines qualified applications as those using "technologies concerned with the production, consumption or transportation of energy, and that have either only recently been discovered or learned, or that involve or constitute meaningful and important improvements in the productivity or value of the technology," according to the language in the proposed rule.

The proposed rule also asks for public input on what the definition of "general use" should be, as EPACT specifies that loan guarantees cannot be issued to projects that use commercial technology already in general use. DOE proposes two alternatives, first that "a technology would be considered to be in general use if it has been ordered for, installed in, or used in five or more projects in the United States at the time the loan guarantee is issued," or second, "whether the technology at issue had been in operation in a commercial project in the United States for a particular number of years, which DOE proposes to be five years." The notice also suggests that public comment address whe-

ther the same standard should be applied for all technologies.

Solicitations on the Way

After a rule governing the loan guarantees is finalized, DOE will administer the program through solicitations. Barnett said the Department will solicit additional applications after a rule is finished and the first round of loan guarantees applications are reviewed. The proposed rule stipulates that the DOE look at a number of factors when evaluating applications—namely, whether the project will receive any other federal subsidies, whether the technology is a proven technology rather than a research and development project, and whether the applicant has a model for commercializing the technology. "Our primary goal is to get these technologies introduced in the commercial marketplace," Hill said. "So we'll be looking at whether it has potential for that and whether the applicant has a plan for doing it." ■

WORLDWIDE SCIENTIFIC BODIES CALL FOR G8 TO ADDRESS CLIMATE CHANGE

The U.S. National Academy of Sciences joined with 12 other national scientific bodies on May 16 calling for leaders at next month's G8 summit in Germany to address climate change and energy security. "Our present energy course is not sustainable," the scientific bodies said in a statement. Population growth and the inability of poor nations to adapt topped their concerns but they emphasized that immediate action would yield results in the future. "The problem is not yet insoluble, but becomes more difficult with each passing day." The national scientific bodies of Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, Russia, South Africa, and the United Kingdom also signed the joint statement.

Technologies such as carbon capture and sequestration and clean coal were identified as critical areas for greater development worldwide and at a local level. "Against this background it will be necessary to develop and deploy new sources and systems for energy supply, including clean use of coal, carbon capture and storage, unconventional fossil fuel resources, advanced nuclear systems, advanced renewable energy systems (including solar, wind, biomass and geothermal energy), smart grids and energy storage technologies," the groups said. Energy efficiency was also identified as one of the most effective ways to reduce energy consumption. "The implementation of measures to increase energy efficiency will depend to a decisive extent on financing options and technology knowledge. A sound financial and technological framework and improved global investment conditions will therefore be vital."

Developed Nations Have Largest Responsibility

The groups emphasized that much of the responsibility to reduce emissions rests on the shoulders of developed nations since they account for nearly all historic greenhouse gas emissions. “G8 countries bear a special responsibility for the current high level of energy consumption associated with climate change. Newly industrialized countries will share this responsibility in the future,” the statement said. “Many of the world’s poorest people, who lack the resources to respond to the impacts of climate change, are likely to suffer the most. The dilemma, however, is that climate protection goals appear to conflict with prosperity targets within the traditional development paradigm. Access to energy resources and affordability of energy services are key factors for the wealth of nations and the well being of their people.” ■

CLIMATE ACTION PARTNERSHIP ADDS NINE NEW MEMBERS

The U.S. Climate Action Partnership has increased its membership to 28, adding nine new members including General Motors, Siemens, and Dow Chemical on May 8. The other new industrial include Boston Scientific, Johnson & Johnson, Marsh, and PepsiCo while the two new NGO’s are The Nature Conservancy and the National

Wildlife Federation. “GM is very pleased to join USCAP to proactively address the concerns posed by climate change and applauds its members for recognizing the important role that technology can play in achieving an economy-wide solution,” General Motors CEO Rick Wagoner said in a statement. Earlier this year in front of the House Energy and Commerce Committee Subcommittee on Energy and Air Quality, Wagoner backed a carbon cap and pledged his help in crafting one. “A central element as we see it is energy diversity—being able to offer consumers vehicles that can be powered by many different energy sources and advanced propulsion systems to help displace petroleum and reduce greenhouse gas emissions.”

The total membership now represents \$1.7 trillion and more than two million employees in all 50 states according to a partnership press release. Membership now includes the following groups: Alcoa, BP America, Caterpillar, Duke Energy, DuPont, FPL Group, Inc., General Electric, PG&E, and PNM Resources, Lehman Brothers, American International Group (AIG), Alcan, Boston Scientific, ConocoPhillips, Deere & Company, The Dow Chemical Company, General Motors Corp., Johnson & Johnson, Marsh, PepsiCo, Shell, Siemens, Natural Resources Defense Council, Environmental Defense, World Resources Institute, Pew Center on Global Climate Change, the Nature Conservancy, and the National Wildlife Federation. ■

Interview

The following interview with Blue Source CEO Bill Townsend was conducted by ExchangeMonitor Publications President and Publisher Edward Helminski and Greenhouse Gas Transactions & Technologies reporter Alexander M. Duncan.

ON CARBON TRADING, SEQUESTRATION BLUE SOURCE CEO BILL TOWNSEND

To start off, how long have you been in the carbon credit business either as Blue Source or Petro Source?

Our first carbon project was in 1996 and we captured the CO₂ from four natural gas treating plants, built and financed an 82-mile geothermic pipeline, and delivered the CO₂ into the enhanced oil recovery market. The project involved existing plants owned by Exxon and Unocal. They had essentially mapped out the underground CO₂ that was sourcing those oil fields to the tune of about two million tons a year, about a hundred million cubic feet a day. In 1997, we sold our first emission reduction from that project. And since then every year, year in, year out, we’ve sold on average probably about four to five million tons of emission reductions.

Since we primarily sell to industrial or financial costumers, our average transaction size is more than a million tons. But we do have some transactions that are small—on the order of 10,000 tons and 35,000 tons. We are not in the retail market. All of our numbers are based on typically very large companies, institutions, financial houses, financial funds who are the interested in the transaction.

Looking ahead to an expected mandated emissions regime, how do you believe entities should be credited for ‘early action’?

I believe there are more benefits to early action than simply getting the transaction qualified as an offset. Early action allows markets to see each other and develop relationships before the markets typically rise within a compliance setting. That relationship is worth a great deal.

With such emission reductions that were completed in a voluntary market, do you believe that there will be validation or assurance issues down the road?

The integrity of the voluntary market is really no different than a compliance market. When you look at their contracts—the language, the qualification, the verification requirements, the registry requirements—they are remarkably either equal to, only slightly less than or slightly more rigorous than clients' markets. They are typically much more cost-effective because the governing body becomes the buyer or the seller, becomes the public registry.

The balance of the record and validation are really what you work through. Every single ton we have done since 1997, without exception, has been third-party verified, typically by a very large engineering company. The crux of this whole integrity issue of the compliance and volunteer markets is that we need to find ways to put regulations on the market, educate the market so that a higher standard is realized. That is why we were third-party validating our offsets back in 1997.

One of the issues with regard to EOR is that roughly 50 percent of the carbon dioxide is recycled. How does that figure into a transaction? How do you take into account that it is not really sequestered?

When you take underground CO₂ and you inject it, if you have a cheaper fresh source of underground CO₂, you will make an economic decision about whether to admit the old CO₂ and take on new CO₂ at a lower cost. The lower cost runs as much as \$3 to \$4 a barrel of oil produced. It is a big number. But it is a much more complex calculation and today in the U.S. we are only aware of three companies who can actually show any sort of recycled emission reductions.

But the practical side of this is still found in West Texas. Today there is 2.5 billion cubic feet per day being injected into West Texas—2.5 billion cubic feet a day, every day of the year. For the last 10 years, an average of about 1.8 billion cubic feet a day have been injected into the ground. From that, go calculate a 5 percent release. With that level of release it just has to be visible. The volume is so big a release could not be passive. It is not going to just be a section of greener grass because CO₂ is slowly seeping up through hundreds and hundreds of square miles—it does not migrate that way. This is going into various small reserves, through 80 different oil fields. One oil field at Texas right now is taking on 300 million cubic feet a day, every single day.

That's an interesting point because one of the major criticisms you hear about EOR is that the oil companies

do not know where the CO₂ is going and don't care where it goes. Is that a valid criticism?

That is just not an accurate description of what the oil industry is about. CO₂ is a cost to the oil industry. About a dollar of MCF pays about \$8 to \$10 a barrel. It is not something that you are just going to say, "Now we are not sure where that is going." They know how much they inject, they look at how much oil is coming up out of the ground, they count how much CO₂ is coming up out of the ground, and then they look to buy 'X' amount of CO₂ more or use recycled CO₂. The standards of accounting for that are certainly not transfer standards, but there are field measuring standards in a way that you would measure operating expense as significant as \$8 to \$10 a barrel. Now, you put \$8 to \$10 a barrel and you look at 150,000 barrels a day being produced out there, that is a huge cost. Or, another way to do it is look at a 1.3 billion cubic feet a day of fresh CO₂, multiply it times 80 cents MCF, you are going to find you have hundreds of millions of dollars of cost that these companies are experiencing. They are not going to simply forget about it. The oil industry does count its CO₂.

Are you, in effect, saying that there is enough monitoring to know that the CO₂ is down there, even if we don't know exactly where it's going?

Some companies are more rigorous about knowing exactly where it is and others are not. The oil industry produces oil and this whole recovery has traditionally been something that they manage in a certain way. The fact that Congress is talking about making CO₂ something different than a commodity from a regulatory standpoint is completely alien to the oil industry. For a long time, they were not present at the table at dialogue and the industry needs to do a better job of explaining how it is managing its CO₂ today, why it is managing it the way it is managing it, and bring that expertise to the table

In as far as carbon credit trades go, would the implementation of a carbon tax assist transactions like this?

I think you can have a hybrid. You are seeing discussions right now on the allocations becoming hybrids, where part of it will be given away. Part of it would be allocated for leverage and part of it will be purchased so that you get a little bit of both. You do not fully draw capital out of the industry by simply buying allocations, but some capital resides in the industry that initiates the bid. Also some of the money being used in the form of the tax that would then go into supporting technology development and other things that the industry may not do on its own.

I would expect there to be some sort of a market mechanism in what the U.S. does because of what our capital structures are and how our markets work. I would think that we would take a market mechanism, find ways to make it highly-efficient and highly-effective. I still think that if they are going to have a market mechanism, it would be a cap-and-trade. It may have a tax component, but maybe partial delivery of allocation to parts who fail. But allowing the market to work is at the heart of the efficiency of the capital structure that the U.S. has.

One of the ideas that is being thrown around here in Washington, D.C., is some sort of price cap for CO₂. Is that something that you think is realistic in terms of actually making the market function freely?

Well, that is the question, is it not? I think we have to try a few things to see how it works. I just think we have to realize that when we design the market, we need to be able to return and look at it after a period of time. Look at how well it is going and be realistic. We probably have to tweak it and change it.

What about the old concept of auctions?

Well, I think the pros and cons are pretty well stated. Some people say money is better left in the industry and some people say money is better left to the government. I probably lean towards money being left in the hands of the market, but I'm not sure, for example, that we would have our highly developed infrastructure system today if that did not happen the way it happened, with a bunch of toll roads.

Let's move on to your business with CO₂ pipelines. Getting more CO₂ pipelines built seems to be one of the missing parts of this debate—a lot of people talk about the capture and sequestration part, but actually getting CO₂ from point A to point B is not being discussed as much. What kind of incentives need to be put in place to change that?

We have recommended that over the next five years, there be direct incentives and regulatory influence to accelerate the capture and storage of CO₂ from non-power generation industries, which would accelerate the build out of carbon transportation and capture infrastructure. Over the next 10 years, we would recommend direct incentives and regulatory efforts toward the infrastructure build-out that would carry CO₂ sourced from the power generation industries as

the cost of separation and capture is reduced. Specifically, we believe that CCS should be approved as a qualified emission reduction activity for carbon trading, thereby creating an additional revenue source to build out infrastructure. Also, CO₂ should not be classified as a waste product by a government agency because that will inevitably cause a loss of interest in CCS and slow the infrastructure build-out. Finally, we believe that the regulatory regime should emphasize existing state regulations on underground CO₂ management instead of adding potential new and burdensome federal regulations.

If there is not a cap-and-trade regime approved this year, what will that mean for the price of carbon a year from now? Will it fall apart?

I do not think it is going to fall apart by any stretch. It is probably going to be somewhere between \$4 and \$6 a ton. Now, if there is something of a compliance market in Europe, if there is a turn back in the general health of the U.S. economy, if there is a critical a bit in the volunteer market to suggest there is an issue of credibility—those things could affect the price. There is legislation because of the election arising and we believe something will be passed actually before the election, but it would not be as robust as it needs to be. There will be as much of an election passage as anything else.

Many observers have been talking about a price of carbon in the range of \$25 to \$30 a ton in order for the industry to make the investment that they need in technologies for gasification. How do you see the market going from where we are now at \$4 to \$6 to \$25-\$30? Would a cap-and-trade do that?

If you sell the CO₂ for EOR at \$15 a ton and are able to get another \$20 per ton for sequestering the CO₂ in a cap-and-trade market, I think you are there. If you get back \$10, then somebody is going to be at risk for \$5 to \$10 more. But I think that is so close to doing a deal and you can see it happening.

Do you see using carbon credits as a contributing factor in financing nuclear plants? Or is that a pipe dream?

I know of one utility company who we have done business with, who wants to move forward right along those lines. They want early action credit for some of the efficiency instrumentation going from analog to digital and getting higher efficiency derivatives and they will try to use any credits to finance new nuclear. ■

Wrap Up

IN CONGRESS

The House approved its FY08 Defense Authorization bill May 17, including a provision which requires a Department of Defense study of the security impacts global climate change. President Bush opposed the provision in a Statement of Administration Policy issued a day earlier. "The Administration opposes section 951, which would mandate the inclusion of a study on global climate change in the next National Security Strategy, National Defense Strategy, and Quadrennial Defense Review," the statement said. "This section sets a harmful precedent. The content of these products should not be reflected in law, particularly in a manner that impinges on the flexibility of national security professionals and policy

officials to determine the most appropriate subjects for these strategy documents."

IN THE INDUSTRY

The more than 500 mayors that have signed the U.S. Mayors Climate Protection Agreement earlier this month called on the United States to enact carbon caps and pledged that their cities would reduce emissions in line with the goals of the Kyoto Protocol. "The demand for action on climate protection is growing every day, in big cities and small towns, in the heartland and on the coasts—and now across the world," Seattle Mayor Greg Nickels (D) said. Nickels launched the agreement in March 2005. "What started in Seattle as a protest against federal policies of delay and denial has become a coalition of communities across America that are making a difference in the future of our planet," he added. ■

Calendar

May

21-23 Forum: Spring Coal Forum; Memphis, Tenn.; Sponsor: American Coal Council; Contact: 602-485-4737; Information: www.americancoalcouncil.org.

22 Hearing: Public hearing on California auto emissions standards with regard to US EPA granting a waiver; EPA Potomac Yard Conference Center, 2777 Crystal Drive, Room S-1204, Arlington VA 22202, 9:00am.

24-26 Conference: Amsterdam Conference on the Human Dimensions of Global Environmental Change; Amsterdam, Holland; Information: <http://www.2007amsterdamconference.org/>.

28 EXCHANGEMONITOR PUBLICATIONS CLOSED FOR MEMORIAL DAY HOLIDAY

28-1 SENATE NOT IN SESSION

29-31 Conference: International Conference on Climate Change; Hong Kong Convention and Exhibition Centre, Hong Kong, China; Contact: Patricia Shiu, 852-2895-4446 or conf3@hkcie.org.hk.

30 Hearing: Public hearing on California auto emissions standards with regard to US EPA granting a waiver; California EPA Headquarters, Byron Sher Auditorium, 1001 I Street, Sacramento, Ca; 9am.

June

4-6 Conference: Coal-to-Liquids Finance and Development Summit; Princeton Club of New York, New York City; Contact: Lorelei Leslie at 818-888-4445 ex. 10.

6-8 Summit: G8 Summit 2007; Heilingendamm, Germany; Information: <http://www.g-8.de>.

10-15 Conference: The Clearwater Coal Conference - the 32nd International Technical Conference on Coal Utilization & Fuel Systems; Clearwater, Florida; Information: <http://www.coaltechnologies.com/conferences.html>.

13-15 Conference: Carbon Finance North America 2007 - Risks and Opportunities in Emissions Markets; New York Marriott East Side, New York, New York; Information: <http://www.environmental-finance.com/conferences/2007/CFNA07/intro.htm> or call +44 (0) 20-7251-9151.

17-20 Conference: Edison Electric Institute Annual Conference/Expo; Denver, CO; Information: http://www.eei.org/meetings/annual_convention/index.htm.

18-20 Conference: 3rd International Green Energy Conference; Vasteras, Sweden; Information: <http://www.igec.info/>.

26-29 Conference: Air and Waste Management Association Annual Conference & Exhibition; David L. Lawrence Convention Center, Pittsburgh, Pa.; Information: <http://secure.awma.org/ACE2007/>.

July

2-6 SENATE NOT IN SESSION

4 EXCHANGEMONITOR PUBLICATIONS CLOSED FOR INDEPENDENCE DAY HOLIDAY

15-18 Meeting: National Association of Regulatory Utility Commissioners summer meeting; Marriott Marquis, New York City; Contact: Rob Thormeyer at 202-898-9382.

23-25 Seminar: PRB Coal Use Seminar; St. Louis, Mo.; Sponsor: American Coal Council; Contact: 602-485-4737; Information: www.americancoalcouncil.org.

August

6-Sept. 3 SENATE NOT IN SESSION

30-31 Conference: Climate Change and Business Conference; Brisbane, Australia; Information: <http://www.climateandbusiness.com>.

September

3 EXCHANGEMONITOR PUBLICATIONS CLOSED FOR LABOR DAY HOLIDAY

4-7

THE FIRST ANNUAL RADWASTE SUMMIT

JW Marriott Las Vegas Resort & Spa
Las Vegas, Nevada

Keynote Address...

- Frank Marciniowski, Deputy Asst Secy, Regulatory Compliance, U.S. Dept. of Energy, Environmental Management
Larry Camper, Director, Division of Waste Management, U.S. Nuclear Regulatory Commission
Bonnie Gitlin, Associate Director, Radiation Protection Div., U.S. Environmental Protection Agency

The conference will address:

- Projections of Rad Waste Volumes Requiring Disposal Across the Federal Government;
New DOE Waste Streams, Including D&D of Oak Ridge Central Campus and Portsmouth/Paducah D&D Plans;
The Future of Class B&C Waste Disposal: Will Barnwell Operations Be Extended past 2008?;
An In-depth Look at DoD Base Cleanup and What That Will Mean for the Rad Waste Industry;
The Status of DOE's Effort to Develop Disposal Options for GTCC Waste;
DOE's Transuranic Waste Strategy and Future Wipp Capacity;
The Latest on Upcoming DOE, DoD and Army Corps Procurements;
What's next for FUSRAP as a Series of Challenging Cleanups Loom;
Upcoming Regulatory Changes at NRC and EPA;
Federal and Commercial Needs to Deal with 'Orphan' Waste Streams;
Future Disposal Operations at Current and Planned Sites;
The Resurgence of Recycling; and
New Packaging, Transportation and Treatment Solutions.

For Information Call 865-966-7124 or
E-mail: carbonsq@exchangemonitor.com

10-14 Conference: 24th International Pittsburgh Coal Conference; Johannesburg, South Africa; Information: http://www.engr.pitt.edu/pcc/2007%20Conference.htm.

October

8-10 Meeting: Coal Market Strategies; Tucson, Ariz.; Sponsor: American Coal Council; Contact: 602-485-4737; Information: www.americancoalcouncil.org.

9-12

THE NINETEENTH ANNUAL WEAPONS COMPLEX MONITOR DOE WASTE MANAGEMENT CLEANUP DECISIONMAKERS' FORUM

Amelia Island Plantation
Jacksonville, Florida

For Information Call 865-966-7124 or
E-mail: forums@exchangemonitor.com

14-17 Conference: Gasification Technologies Conference; Hyatt Regency, San Francisco, CA; Contact: Robert Childress at rchil@jchildress.com.

November

12-16 Meeting: 27th Session of the Intergovernmental Panel on Climate Change; Valencia, Spain; http://www.ipcc.ch.

22-23 EXCHANGEMONITOR PUBLICATIONS CLOSED FOR THANKSGIVING DAY HOLIDAY

December

3-4 Conference: Coal Trading Conference; New York, N.Y.; Sponsor: American Coal Council; Contact: 602-485-4737; Information: www.americancoalcouncil.org.

(Changes from previous Calendar in Bold)

GHG TRANSACTIONS & TECHNOLOGIES

GHG Transactions & Technologies, published twice-monthly (24 issues/year) by ExchangeMonitor Publications, Inc., is devoted exclusively to covering government & industry, policies, programs, technologies related to the reduction of Greenhouse Gas Emissions & carbon credit transactions.

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